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RESETTLEMENT OF THE DISABLED SERVICE MAN

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SINCE the end of the war the problem of employing disabled persons has attracted much attention. Statutory legislation and voluntary organizations have done much to facilitate the reintegration of the disabled into normal life. The importance of resettlement and the unique responsibility of the medical profession in this field have been well stressed in recent publications (Cooksey, 1954; O'Malley, 1954), but there are few factual surveys showing the effects of the national scheme in individual cases.

In this paper are presented the results of such a survey in men who had been invalided from the three Services. The work was carried out at the Medical Rehabilitation Unit, Royal Air Force, Chessington, which provides comprehensive facilities for the residential rehabilitation of men suffering from all types of disability, excluding psychiatric cases. Normally resettlement is aimed at returning these patients to full Service duties. Some 20% are returned for modified duty or remustered to another trade within the Service, and 2% are invalided.

Material

During the last four years 167 patients had to be invalided from the Service and attended our resettlement clinic. The disabilities from which these patients suffered included poliomyelitis (22 cases), osteoarthritis of knee (10), fractured femur (6), ankylosing spondylitis (6), nerve lesions (6), and multiple fractures (6), together with a wide range of other disabilities—orthopaedic, medical, and surgical. All patients received full-time

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rehabilitation until the maximum possible functional improvement was obtained. The treatment provided included class exercises, remedial games, hydrotherapy, physiotherapy, occupational therapy, and trade rehabilitation (Wynn Parry, 1954). A proforma was sent to all 167 patients as a follow-up and replies were received from 114 of them.

Procedure

As soon as it is clear that a patient will be invalided from the Service on medical grounds he is asked to attend the Unit Resettlement Clinic. This clinic, which takes place weekly, is attended by the patient, his own medical officer, the medical officer in charge of the clinic, the local disablement resettlement officer (D.R.O.), the education officer, the welfare officer, and the occupational therapist.

To achieve satisfactory resettlement the aims are fourfold: (1) the job should be well within the patient's physical capabilities; (2) it should offer security and good prospects of advancement; (3) it should be related whenever possible to the patient's previous experience and individual talents; and (4) its achievement should give him satisfaction.

At the patient's first attendance his medical officer acquaints the members with his case history, physical condition, and social history. The patient is encouraged to discuss his own ideas on his future; the D.R.O. explains the national facilities available, including details of registration and the Government Training Scheme; and problems concerning the patient's accommodation, domestic arrangements, finance, and local labour conditions are discussed.

The next stage is for the patient to decide on a primary and subsidiary choice of work. According to his choice a rough physical capability test is carried out. The occupational therapy department is used to simulate work conditions and to give an idea of general capabilities, such as application, concentration, use of tools, planning, dexterity, and imaginative ability.

At his next attendance at the resettlement clinic a work report is presented from the department concerned; also an educational assessment when appropriate. The D.R.O. then finds out the training possibilities and local employment prospects in the trade chosen. If his report is favourable, treatment is directed towards functional rehabilitation in this trade. If the D.R.O.'s report is unfavourable or the patient has little or no idea about his future employment, further exploration is necessary.

Through the kindness of the Regional Office of the Ministry of Labour, arrangements have been made for selected patients to attend the Government Training Centre at Waddon for a trial period of work. This trial of work is arranged for both those patients who have made a definite choice and those who have few ideas about their future.

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In the first case the object of the trial period is threefold:

- (1) To find out if the patient is physically capable of the work involved. However accurate a clinical assessment has been made, and however successful the trials of work at the unit have been, there is only one certain way of knowing if the patient will stand up to the job, and that is by his performance of it.
- (2) To find out if the patient is temperamentally suited to the job and will actively enjoy it.
- (3) To find out whether he is likely to give satisfaction to an employer in that job.

This trial period usually lasts two weeks. Once the patient has completed his trial of work at the Government Training Centre, the D.R.O. investigates the availability of courses in this trade near the patient's home and the local employment prospects.

If the patient is fit to be invalided at this stage, ideally he should start straight away on the course or at any rate go directly into some form of employment. If there is a waiting list for the course the D.R.O. will then contact the patient's local D.R.O. to arrange suitable temporary employment. Most patients will, however, have to remain under treatment at the unit for some time, spending two or three afternoons a week doing part-time training for their job.

When the Government establishments do not provide training in a particular trade, the facilities available under the Vocational Training Scheme with individual employers are used.

In the second class, of patients who have few or no ideas about future employment, this trial period allows them to see a wide variety of occupations and, even more important, other disabled people successfully coping with them. The trial period may last only one day for the patient to gain ideas, or last up to a week. On selection of a suitable trade he then starts a proper period of trial work as for the first group.

During the last four years thirty-three patients have attended the Government Training Centre at Waddon under this scheme, and there is no doubt in our minds that the scheme has been a success.

Many of the Government training courses require the candidate to pass an interview and a written test. The education officer prepares patients for this test by short refresher courses. For those patients who are unable or do not wish to undertake formal training, liaison is effected between the respective D.R.O.s. The patient is sent on a period of resettlement leave to find out the nature and prospects of local employment. Should there be any doubt as to a patient's physical or intellectual ability in his chosen job, the employer concerned is written to and asked to consider giving him a short trial.

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There are a few courses in the R.A.F. which disabled patients may take to fit them for civilian employment under the Recuperative Employment Scheme. These include aircraft inspection and meteorology courses. Four patients have been re-trained under this scheme and have been satisfactorily resettled. In a few cases employers in the vicinity of the unit have kindly taken on patients for part-time training in trades not covered by the Government Training Scheme.

The Air Ministry Resettlement Branch is always available for advice and guidance on all resettlement matters, and have obtained grants through the Royal Air Force Benevolent Fund for supply of cars and tools to certain patients.

Results

The results are presented in the form of answers to the questions asked on the proforma sent to patients:

1. *Was the Resettlement Clinic of help to you?*

109 (96%) replied "yes" to this question.

5 replied "no". These five patients included two who discharged themselves from the unit, two who are still in hospital, and one who preferred to make his own arrangements.

2. *Have you done any training courses since leaving? If so, what and where?*

33 undertook Government training courses.

9 are still under training at Government training centres.

Thus 37% of the patients took Government training courses. The most popular courses were watch and clock repairing, draughtsmanship, motor mechanics, and radio repairing; the others constituted a good cross-section of the various available courses.

9 undertook private training courses of various types.

3. *Was the training given up to your expectation?*

All those who took private training replied "yes".

Of the 33 who have completed Government training courses, 31 were satisfied. The two who replied "no" complained of out-of-date equipment.

The 9 still undergoing training all expressed their satisfaction to date.

3 replied that employers preferred trainees from a particular Government training centre in preference to others.

4. *Was there any difficulty in finding a job either after training or on leaving the unit?*

81 (71%) found no difficulty in obtaining employment.

16 found considerable difficulty, 4 had slight difficulty.

3 are still in hospital.

9 are still receiving training.

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Of the 16 who found considerable difficulty, this was due entirely to the disability in 6 who had a chronic remittent disease. Those who experienced slight difficulty all obtained employment within a short time.

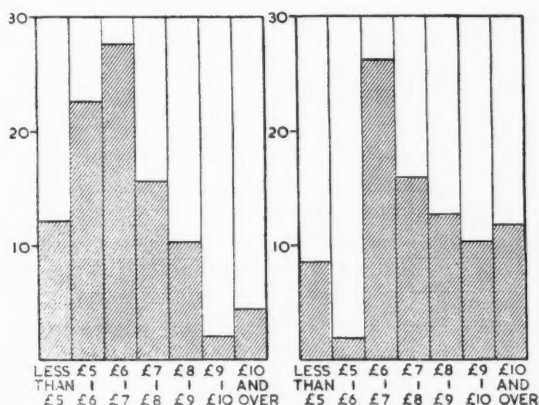
5. *What is your present job, and is it the same as when you became a civilian?*

Of the 94 (82%) patients actually in employment, 79 (84%) are in the same job as when they left.

15 have changed their job; 9 were forced to change their job through disability; the other 6 were in a temporary job.

6. *What sort of wages did you earn when first released from the Service, and what do you earn now?*

This information is given in the following graph, which shows the shift towards higher wages on an average of eighteen months later.



Graph showing weekly wages earned on leaving the unit (left) and on follow-up an average of 18 months later (right).

7. *Are you happy about your job and its prospects, or do you wish that you had done some other work?*

17 patients (15%) replied "no". All the other 97 were fully satisfied.

Of the 17 patients who said "no", 9 (all with chronic remittent disorders) found their disability prevented them performing their work satisfactorily; 6 complained that the prospects in their particular firm or trade were poor; and 2 had not yet decided what sort of job they were fitted for.

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8. *Is your disability better, the same, or worse than when you left the unit?*

51 replied that their disability was the same, 41 that it was better, 18 that it was worse, and 3 that it was variable.

Discussion and Conclusions

The results of this survey suggest that, in general terms, the resettlement scheme adopted at this unit is successful. Of the total of 167 patients, 31 volunteered the information that their period under rehabilitation and the re-training scheme gave them the confidence to face their civilian future; 10 said that they had been given opportunities which they could not have had without being disabled. Only 19 were accounted failures under the scheme (see below).

We feel that the importance of a thorough trial of work before starting employment cannot be over-emphasized. At our unit this takes the form of a trial period at a Government training centre, or in a few cases actual trial with the employer concerned. Theoretically a successful trial period of work should mean no resettlement failures. In practice, the vagaries of human nature being what they are, this is not true, but the failures can be kept to a minimum. One of the factors making for success after disablement is the patient's complete confidence in his ability to do the job. Furthermore, a proper trial can prevent breakdown under training with its concomitant hardship for the patient and waste of public money.

The environment during the resettlement process is all-important. Patients undergoing full-time intensive treatment aimed at their future training or employment develop the optimism, incentive, and confidence that are so necessary. This fact was made evident by many of our patients. It is also our impression that patients enter more readily into the spirit of resettlement when their own doctor initiates and guides the resettlement programme. Mixing with others in the same plight has a definite beneficial effect.

All patients should be encouraged to live as full a life as possible. This may seem to be self-evident, but it is sometimes forgotten that advice about sport, recreation, hobbies, etc., is just as important as advice on work. The patients severely disabled by poliomyelitis stressed in their replies that regular swimming and absorbing hobbies kept them at maximum fitness and increased their work capacity. Thus it is essential to ensure that the type of work undertaken leaves enough energy for sport and recreation. Work is, after all, not the only object of resettlement.

Most of the points that need attention in resettlement have been made by other authors, but we should like to recapitulate that resettlement cannot start too early, that we must be prepared to work on trial and error lines, and that the fact that the patient's family may need as much resettlement as the patient himself must be taken into account.

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Nineteen of our patients found difficulty in obtaining employment, and these must be accounted failures. Six of these patients suffered from chronic relapsing disorders such as rheumatoid disease, ankylosing spondylitis, and chronic bronchitis, the nature of which makes adequate resettlement virtually impossible. Constant review is of course essential, but it is clear that without special arrangements industry cannot cope with these problems. No doubt intermittent employment is regarded as uneconomic by employers, but even this has an economic value for the nation as a whole. We feel that every effort should be made to solve this problem. Some of our patients found employers and trade unions antagonistic to the employment of disabled persons, and here again efforts should be made to educate employers and the unions in their responsibility, which is to give a disabled man the chance to prove himself on the job. When correctly placed in a job the disabled man is often a more loyal and conscientious worker than the able-bodied.

Some of the failures may be accounted for by our accepting the patient's assurance that he could resettle himself. We now know that what at first appears to be a satisfactory job may turn out to be too much for the patient's disability over a long period, or may offer him poor prospects though the starting wage is acceptable. It is not always easy to get young people to look ahead. The more seriously disabled a man is, the more important it is to ensure that his job is skilled and offers reasonably good prospects, irrespective of economic regressions.

Some of our patients refused a Government training course as they could not afford to support their wives and families during the training period. There would seem to be a case for increasing the allowances for this type of patient.

We have experienced considerable difficulty in arranging through the appropriate bodies that a seriously disabled patient shall receive his invalid motor tricycle and be placed at a training centre or in employment at the same time. Provision of a motor tricycle is the responsibility of the Ministry of Health or of Pensions; provision of a training course or employment that of the Ministry of Labour or Education. Each Ministry makes the possession of a tricycle or a place at a training centre dependent on the possession of the other. Delays in the delivery of these tricycles are frequent and garage accommodation often presents difficulties. It seems to us that there could be more integration between the various Ministries and Departments concerned. In particular the regulations governing the application for and delivery of motor tricycles could be simplified. We also feel that for a severely disabled man a motor-car adapted with appropriate controls would be more useful than a motor tricycle. As the tricycle costs over £300, the extra cost, particularly if purchase tax were waived, would not be excessive.

Voluntary organizations or the disabled themselves are expected to

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undertake many aspects of the problem that are the State's responsibility. This applies particularly to the provision of self-help devices. Gadgets to enable patients to feed and dress themselves are just as important as motor tricycles in rendering them independent of another person's care.

The last cause of failure—and an insuperable one—is the housing shortage and the long waiting lists for council houses. If there is no suitable employment in a person's home area it is no answer to recommend him to remove to another area where accommodation is impossible to obtain. Priorities for the disabled do not work out in practice, and insufficient consideration is given to them in many areas.

Many patients were completely ignorant about the facilities for changing jobs, inquiring about pension difficulties and national assistance, etc. There is great need for publicizing the various concerns prepared to advise patients on these matters.

The ultimate responsibility for satisfactory resettlement lies with the doctor. Only when every doctor realizes this responsibility and presses vigorously for better facilities for the disabled will the needed improvements materialize.

Summary

The results of a follow-up of 167 disabled ex-servicemen invalided from the Medical Rehabilitation Unit, R.A.F., Chessington, during the past four years are presented.

The scheme of resettlement used is described in detail and the statistical results of 114 replies to a standard proforma are given.

The results of the scheme are discussed and the causes of failures in resettlement are examined. Methods to remedy these failures are recommended.

Acknowledgments

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REHABILITATION OF THE DISABLED HOUSEWIFE

REPORT OF A YEAR'S WORK

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It has been stated (Cooksey, 1952) that housewifery is the largest "industry" in the country, and probably the most important one. Despite this, however, and although much progress has been made in resettling the disabled industrial worker, little has been done for the disabled housewife. To further this object a scheme has been instituted in the Department of Physical Medicine at King's College Hospital, London (Cooksey, 1952), where a portion of the occupational therapy department has been set aside for the assessment and training of the disabled housewife. This includes a kitchen unit, essentially designed for work simplification and adapted to meet functional disability. The kitchen is so arranged that everything necessary to run it is within the reach of a patient confined to a wheelchair. The majority of the housewives who receive training in the unit are out-patients and include a high proportion with neurological conditions. A similar scheme has been introduced by Howard Rusk at the Bellevue-Cornell Medical Center in New York, in connexion with which a training unit has been set up at the Institute of Physical Medicine and Rehabilitation.

In June, 1953, a household training scheme based on those referred to above was set up in the Rehabilitation Unit of the Devonshire Royal Hospital, Buxton, and the results of the first year's experience seem sufficiently interesting to merit publication. The unit is concerned mainly with in-patients, the majority falling into the "arthritic" group. Consequently the household training unit was designed primarily to meet the needs of this type of patient, the main features being that all work must be done between knee and shoulder level and that heavy work must be avoided.

The Household Training Unit

This consists of two small adjacent rooms, 14 feet by 9 feet and 12 feet by 7 feet respectively, in the occupational therapy department. The larger is fitted up as a twin kitchen, having two separate sink units each connected by working surfaces and ramps to a cooker. One half of the kitchen is fitted with a gas cooker and the other half with an electric stove. One sink has the draining-board to the right and the work surface and cooker

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to the left. The order is reversed in the other half of the unit. The cookers are raised on 4½-inch wooden blocks, and the sinks fitted at a height of 36 inches. All equipment used is either commercially available or can be simply and cheaply made, and is so far as possible restricted to that normally found in an ordinary working-class home. All necessary alterations and adaptations have been purposely left exposed, and the appearance of a model kitchen shining with chromium and tiles has been avoided.

With two kitchen units it is possible to adapt each differently. For example, one sink has lever tap handles and a common mixing spout leading to a flexible metal hose with a variable rose; the other sink has cheaper alternatives—the ordinary four-pronged tap handles (turned, if difficult, with a cheap wooden gadget) and detachable plastic tubing.

The second, smaller room of the unit is equipped as a "utility room", with a sink, draining-board, wringer, adjustable ironing-boards, and clothes airers. In this room domestic laundry work can be done. The empty floor space and large glass windows provide ample scope for cleaning practice.

Many of the details of work simplification and suitable gadgets for the disabled housewife have been adequately described elsewhere, particularly in the publications of the Institute of Physical Medicine and Rehabilitation, New York, and it is not intended to repeat their description here.

Organization

All seriously disabled women admitted to the rehabilitation unit were considered for household training. This was not started until medical treatment had been terminated and their physical rehabilitation was well under way—in fact not until the immediate end-point was in sight. This was usually about three to eight weeks before discharge from hospital. All patients in the rehabilitation unit are normally instructed in the activities of everyday living; and walking, dressing, and toilet activities (taught jointly by the physiotherapy and occupational therapy staff) are continued during the period of household training.

During the year June, 1953, to May, 1954, approximately 150 in-patients passed through the household training unit. Unfortunately, however, our initial recording system has proved inadequate, and only 81 cases are suitable for analysis. Out-patients have not been included in this report.

When the patient first joins the training unit a functional assessment chart based on Howard Rusk's "Activities of daily living" (1953), and also including a comprehensive list of household activities, is completed by the occupational therapist who will be responsible for the patient's training. A further assessment is made monthly, and on discharge a final summary of

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residual disabilities is compiled and a "prescription" of household alterations and gadgets necessary prepared. Such gadgets are made in the department workshops and supplied at cost.

The patient begins by working an hour a day in the kitchen, and her working periods are gradually extended until eventually she is doing a full (or her maximum) day's work, including the preparation, serving, and clearing up after meals, household cleaning, laundry, and floor-polishing. When the unit was originally set up rationing was still in force, and it was necessary to register it as a catering establishment so that rations could be drawn. The food prepared is eaten instead of hospital meals.

The utility room remains freely open outside working hours, and patients are encouraged to do their own personal small items of laundry.

Material

DIAGNOSIS

The subjects given training fell into five main groups.

Group I.—This group—much the largest—consisted of 59 patients with rheumatoid arthritis. Most of the cases were severe; many of the patients had been bedridden for years and suffered from major deformities and fixed joints. Only 16 were working at jobs other than household duties at the time of onset of the disease.

Group II.—In this group were 7 patients on whom an operation on the hip had been performed—four for osteoarthritis and three for fractures of the neck of the femur. Four had an acrylic arthroplasty and three a central dislocation arthrodesis.

Group III.—This group contained 7 patients with neurological disease, including two with anterior poliomyelitis, two with hemiplegia, and one each with disseminated sclerosis, polyneuritis, and transverse myelitis. All had very severe lesions. Four subjects were incapable of any household activity, and the other three could do only minor housework.

Group IV.—The 4 patients in this group had all sustained a complicated major fracture—in two cases of the tibia (with delayed union), in one case of the shaft of the femur, and in the other of the femoral neck in a patient aged 78.

Group V.—There were 3 patients in this group, all of whom had extensive burns, in two cases involving the hands.

AGE

The ages of the subjects ranged between 19 and 78 years, with the heaviest concentration in the 40-50 age group. Only twelve of them (including the two with poliomyelitis and the three with burns) were under the age of 35, so that, although the majority of them were primarily

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housewives, only a few were concerned with the care of young children. Most of them lived alone, or looked after a husband, or had children at home old enough to help with household duties.

Results

The subjects were assessed as to their housework capabilities both at the beginning and at the end of the training period, and their abilities were graded according to the following scheme:

Grade 0 = Full housework

Grade 1 = Major housework (everything except heavy work such as floor-scrubbing, heavy laundry, etc.)

Grade 2 = Minor housework (dusting, meal preparation, light laundry, etc.)

Grade 3 = No housework (no useful contribution to household).

There are obvious difficulties in deciding on grading, particularly between Grades 1 and 2. The distinction was made by putting a patient into Grade 1 only if she was capable of running a home with just occasional or minor domestic help. Thus, any subject in Grade 0 or 1 is fit to run a household, while one in Grade 2 or 3 either needs major and regular help or is completely incapable of contributing anything useful to running a home.

As the disease process was fairly stable by the time household training was started the initial grading is a measure of residual functional disability, and the difference between this and the final grading is an indication of the degree of functional improvement. It has not yet been possible to follow these patients up to see whether the gain has been maintained.

TABLE I
SUMMARY OF RESULTS

Group	No. of Patients	Age		Grade (Mean)		
		Mean	Range	Initial	Final	Gain
I	59	45.5	19-69	2.07	1.20	0.87
II	7	59	51-69	1.86	1.14	0.72
III	7	48	31-61	2.57	1.14	1.43
IV	4	66	55-78	2.75	1.75	1.00
V	3	25	20-34	2.00	0.67	1.33

The results* (Table I) vary with the diagnosis, and as might be expected the patients in Group V, being the youngest and suffering from a self-limiting condition, did very well. All three, though initially capable of

* In addition to the 80 subjects included in Table I there was one patient aged 60 with osteoarthritis of both knees who showed no improvement in grade, both the initial and final assessment being Grade 2.

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light housework only, after training were able to run a household. Those in Group III, although relatively young, were seriously disabled when they began their training (four Grade 3 and three Grade 2); they did well and only two subjects finally were unable to do major housework. The four patients in Group IV were severely disabled, and remained so; only one became capable of major housework. These poor results are probably also a reflection of the age of this group. The patients in Group II, despite a mean age of 59, did moderately well, and though at the outset only one subject was capable of major housework, six out of the seven finally reached Grade 1.

Group I (rheumatoid arthritis) had a high disability grade at the beginning of training, but did surprisingly well nevertheless. Although initially 80% fell into Grades 2 and 3, at the end of training there were only 37% in these grades, and actually not one patient was completely unable to do some household work. Tables II and III give a detailed analysis of the 59 subjects in this Group.

TABLE II
GRADE DISTRIBUTION OF 59 SUBJECTS WITH RHEUMATOID ARTHRITIS

		Grade 0		Grade 1		Grade 2		Grade 3	
		No.	%	No.	%	No.	%	No.	%
Initial	..	0	0	12	20	31	53	16	27
Final	..	10	17	27	46	22	37	0	0

TABLE III
GRADES GAINED DURING TRAINING BY THE PATIENTS IN GROUP I*

Grade:	0	1	2	3
No. of Gains	17	36	5	1

* E.g., a change from Grade 3 to Grade 1 is a gain of 2.

Table III shows that, although 17 of the 59 subjects did not improve during training, 36 gained one grade; 5 gained two grades; and 1 gained three grades, from being completely disabled to being capable of doing normal housework.

Conclusions

Retraining the disabled housewife in household duties, kitchen techniques, and work simplification is a rewarding process. Even in the very difficult groups of patients considered here useful gains were made in most cases. Of the 81 subjects reported, although at the start 23 were

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completely incapable of any housework and 44 were capable only of minor housework (total of Grades 2 and 3=67), at the end of training there was no one completely incapable of housework and 29 capable of minor housework. The remaining 52 subjects were able to run a normal household.

These household training units are cheap to instal and run, and it is surprising that so few seem to have been established in this country.

Summary

A unit for retraining the seriously disabled housewife is described and a report of the results of its first year's work presented.

Among the subjects taking part were 59 with rheumatoid arthritis, 7 who had had a hip operation, 7 with neurological conditions, 4 who had sustained a major fracture, 3 with extensive burns, and 1 with osteoarthritis of both knees.

Of the 81 subjects, 23 were incapable of any housework and 44 capable only of minor housework at the outset. At the end of training no subject was completely incapable of housework, and 52 subjects were able to run a normal household.

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A CRITICAL EVALUATION OF SYNCARDIAL MASSAGE

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IN 1945 Fuchs described syncardial massage as a method of increasing the peripheral blood flow and reported on its use in the treatment of diabetic and arteriosclerotic arterial disease. Briefly, the method consists in the application to a peripheral artery of rhythmic impulses delivered mechanically through a manometer cuff wrapped about the treated limb, such impulses (or inflatory shocks) being timed to occur at that point in the pulse cycle of the artery when the pressure is falling. To produce this sequence of events, Fuchs employed electrocardiographic leads to determine the timing of ventricular systole, from which the time of arrival of the pulse wave in the peripheral artery beneath the manometer cuff was calculated. The delay mechanism of the machine was set in accordance with this information, and the instrument was then operated at about 40 to 50 mm. Hg for a treatment period of a quarter of an hour.

Physiologically, it was assumed that each inflatory impulse impressed a forward impetus on the contained column of blood as the pulse passed. "The pneumatic pressure impulses increase the excursions of the arteries in their physiological rhythm . . . syncardial massage thus acting as a sort of auxiliary heart" (Fuchs, 1948). Besides this, the venous return and lymphatic flow were both considered to be increased.

A group of cases treated by Fuchs gave very encouraging results. Of 44 patients with intermittent claudication, perforating ulcer, or gangrene, assessed after an average of 22 treatments, the improvement noted in 26 (59%) was classed as "very good" and in 12 (27%) as "satisfactory", while 6 patients (14%) showed no response. Intermittent claudication was either relieved or ameliorated, early gangrenous changes in the toes caused to recede, and several large ulcers successfully healed. These cases, described as severe, had been uninfluenced by all previous methods of treatment.

The Clearance of Radioactive Sodium

Kety (1948, 1949) first demonstrated that the clearance of intramuscularly injected radioactive sodium (Na^{24}) from the injection site could be used as a measure of local circulation. He predicted that a deposit of Na^{24} injected directly into a muscle would decrease along a single exponential curve, which, when plotted semilogarithmically, would

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yield a straight line whose slope (clearance constant, or k) would prove to be a quantitative measure of the total ability of the local circulation to remove, and similarly to supply, freely diffusible substances. In his conclusions to his paper on "Tissue Clearance of Inorganic Ions", McGirr (1952), quoting Barron *et al.* (1951), states: "It appears from these studies that not only is the sodium clearance exponential, as Kety predicted, but it is reasonably well established that the clearance constant, k , is a quantitative index of the over-all efficiency of the local circulation."

Investigating the effect of exercise on the clearance of Na^{24} , Kety (1949) showed that exercising the leg for the short period of one minute increased the mean clearance in the gastrocnemius muscle by over 100%.

The effect of "priscol" (tolazoline; 2-benzyliminazoline hydrochloride) on the peripheral circulation was reported on by Freund *et al.* (1953). In these experiments priscol was injected into the femoral artery and the clearance of Na^{24} estimated from the gastrocnemius muscle. A small but statistically significant increase in the clearance constant of Na^{24} was obtained. This increased clearance was demonstrated both in normal controls and in patients with arteriosclerosis obliterans. In each of four cases subjected to thoracolumbar sympathectomy, Reese *et al.* (1951) found a postoperative increase in the clearance constant, while out of four cases subjected to the lesser operation of lumbar sympathectomy, only two gave increased constants.

From the foregoing remarks, the use of Na^{24} to study the local circulation being now recognized as an established technique, it appears that if syncardial massage is indeed useful as a means to increase peripheral circulatory flow, then it might be expected to increase the clearance of radioactive sodium.

Method and Procedure

For this investigation two patients with known obliterative arterial disease were chosen.

Case 1.—T.K., male, aged 59. Pain in right calf after walking 20 yards. Peripheral pulses not affected, but calcification present in radiographs of right femoral and posterior tibial arteries. Concomitant osteoarthritis of right hip and mild bilateral osteoarthritis of knees.

Case 2.—R.P., male, aged 71. Almost continuous pain felt deeply in muscles of left foot. This pain was so aggravated by putting the foot to the ground that walking had become impossible. On palpation a difference in temperature was found between the two feet—the left being markedly colder than the right. The pulses of the posterior tibial and dorsalis pedis arteries could not be felt on the affected side.

The room temperature was maintained between 20° and 21° C. throughout the investigation. The subject having spent an initial period

Syncardial Massage

of a quarter of an hour lying supine on the measurement couch, 5 μ c. of Na^{24} in 0.2 ml. of isotonic saline was injected into the gastrocnemius muscle on the affected side to a depth of 2 cm. Counting rates were recorded with an uncollimated Burndepth B.N. 101 scintillation counter clamped firmly over the injection site. The counter was connected through a linear amplifier with a gain of $400\times$ to a counting-rate meter (E. K. Cole Ltd., Type N.522) feeding an Everitt-Edgcumbe "inkwell" pen recorder. The pen recorder was operated at a paper speed of 12 inches an hour. The counting rate immediately following injection was of the order of 4,000 counts per second. From the fall in counting rates observed on the trace, the clearance constant, defined by

$$k = \frac{\log C_1 - \log C_2}{0.4343(T_2 - T_1)}$$

could be calculated.

Clearance measurements were made on each of the patients under the following conditions: (1) with the machine off; (2) with the manometer cuff in position just above the knee and the machine operating correctly; and (3) with the manometer cuff left as above but with the machine set to operate out of phase (i.e. the inflation of the cuff timed to occur on the upstroke of each pulse wave).

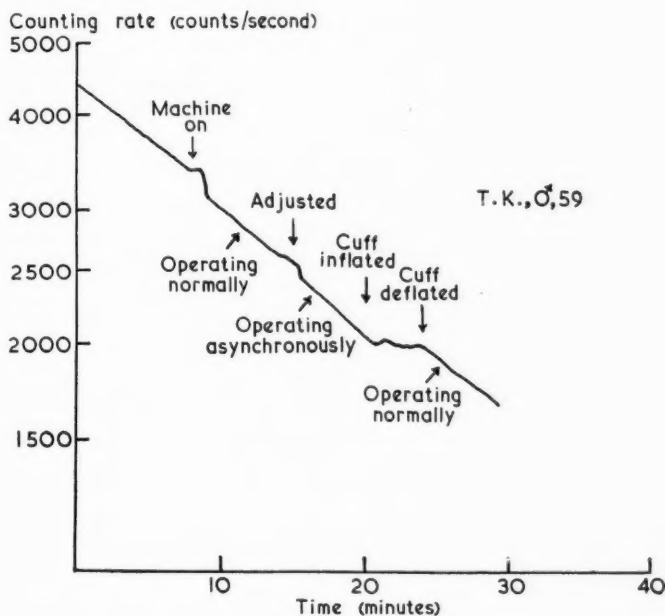


FIG. 1

Results and Discussion

While the machine is not operating the counter records the natural clearance of Na^{24} from the gastrocnemius muscle at rest.

While the machine was operating correctly and syncardial massage occurring, an increase in circulatory flow through the gastrocnemius muscle might be expected to give an increased clearance. On the other hand, while the machine operated out of phase (a condition which, it was assumed, would impede the circulation), a reduced clearance was expected. However, the tracings of the pen recorder (Figs. 1 and 2) show a steady downward slope, apparently uninfluenced by the machine—whether off or on, operating correctly or out of phase. It is, however, interesting to note that whenever the manometer cuff is allowed to remain inflated, as seen in each of the tracings, the clearance is reduced immediately to zero.

The Table shows values of the clearance constant k derived from the data in Figs. 1 and 2. It will be seen that within the limits of experimental error in each of the two patients investigated, k remained constant under the three sets of experimental conditions studied. There was thus no evidence of an improvement in the peripheral circulation having occurred during syncardial massage.

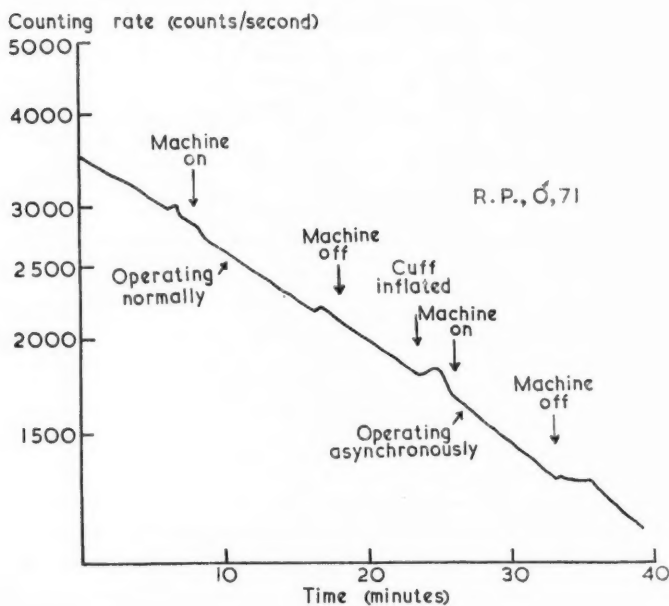


FIG. 2

Syncardial Massage

TABLE SHOWING VALUES OF CLEARANCE CONSTANT k

Case No.	Site of Injection	Experimental Conditions	Half Clearance Time (minutes)	Clearance Constant (minutes ⁻¹)
1	Right gastrocnemius	Machine off	21	0.033
		Machine on (operating normally)	20	0.034
		Machine on (operating out of phase)	19	0.035
2	Left gastrocnemius	Machine off	24	0.029
		Machine on (operating normally)	24	0.029
		Machine on (operating out of phase)	22	0.031

Summary

Syncardial massage as a method to increase peripheral circulatory flow has been investigated, radioactive sodium being used as an indicator.

In two patients with obliterative arterial disease no significant change was found in the clearance constant of this substance from the gastrocnemius muscle under three experimental conditions: (1) with the syncardial machine off; (2) with the machine on and operating correctly; and (3) with the machine on and operating out of phase.

Acknowledgments

We wish to thank Dr. F. Bach, Director of Physical Medicine, St. Stephen's Hospital, and Professor W. V. Mayneord, Director of the Physics Department, Institute of Cancer Research, for permission to carry out these studies.

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CLINICAL REPORTS

HAEMARTHROSIS IN CHRISTMAS DISEASE

THIS case is reported because of the rarity of Christmas disease. Although the patient was referred to the out-patients department with a diagnosis of rheumatoid arthritis and a request for further cortisone treatment, it was found on close questioning that he had a history of bleeding since infancy.

Case Report

M. M., a male artist aged 25 years, complained of recent acute pain in the left hip together with previous episodes of pain in the right hip, right knee, and left elbow joints. He had been treated elsewhere with systemic cortisone, 25 mg. a day, for a period of two to three weeks. He was known to have a tendency to bleed, this being first noticed during circumcision and accepted as due to haemophilia, though it had not responded to antihaemophilic globulin. He had no family history of bleeding.

Clinical examination showed early flexion deformity of the right hip and knee joints and a hot, tender swelling in the thigh with bruising consistent with haemarthrosis. Neither the peripheral joints nor the spine were affected, and all other systems were normal.

Haematological investigation showed: clotting time, 30 minutes; bleeding time, 1½ minutes; prothrombin time, 100% normal; platelets, 230,000 per c.mm.; haemoglobin, 89% (Haldane); E.S.R., 8 mm. in 1 hour (Westergren); leucocyte count, normal. X-ray examination of the right hip and knee and the left elbow showed well-marked loss of joint space with irregularity of the surfaces but no osteophyte formation.

The patient was admitted to hospital and treated with a transfusion of 1½ pints of fresh plasma with immediate improvement. The fact that he responded promptly to a small plasma transfusion but had not responded to antihaemophilic globulin suggested a deficiency of Christmas factor. This was confirmed by the thromboplastin generation test (Biggs and MacFarlane, 1953) using normal platelets, the results of which are shown below. Delay in clotting

RESULTS OF THROMBOPLASTIC GENERATION TEST

Source of			Clotting Time of Substrate Plasma in Seconds after Reacting for (minutes)				
Al(OH) ₃ -treated Plasma	Serum	Substrate Plasma	1	2	3	4	6
1. Normal ..	Normal ..	Normal ..	48	10	11	10	9
2. Patient M. M.	Normal ..	Normal ..	34	12	9	10	11
3. Normal ..	Patient M. M.	Normal ..	68	72	48	35	30
4. Normal ..	Normal ..	Patient M. M.	35	9	8	9	11

Haemarthrosis in Christmas Disease

occurred only when using the patient's serum as a source of Christmas factor (line 3), but not when using his plasma as a source of antihæmophilic globulin (line 2). The last-mentioned is a control line showing the absence of an inhibitor of thromboplastin formation.

Discussion

Christmas disease was first separated from hæmophilia in 1952 (Biggs *et al.*). It has the same clinical, genetic, and usual laboratory features as hæmophilia, but there is no deficiency of antihæmophilic globulin. Thromboplastin formation is grossly reduced by the absence of an enzyme (Christmas factor) readily obtained from normal serum. As it is an enzyme and therefore not used up in the clotting process, small quantities of serum are effective in stopping bleeding. Being stable, stored serum (or plasma) can be used.

About 10% of cases previously diagnosed as hæmophilia are due to deficiency of Christmas factor, which should be suspected if the bleeding is quickly controlled by small transfusions of serum, or if it does not respond to antihæmophilic globulin. Confirmation can be obtained by the thromboplastin generation test.

Acknowledgments

Our thanks are due to Dr. A. T. Richardson for permission to report this case, and to Dr. W. J. D. Fleming, hæmatologist to the Royal Free Hospital, for the special investigations.

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NEW APPLIANCES

A METHOD OF DETERMINING THE EFFICIENCY OF A THOMAS WALKING CALLIPER

THE Thomas walking calliper is a valuable weight-relieving appliance which is widely used in the treatment of various disabilities involving the lower limbs. This appliance would probably be more widely used if the physician had at his disposal a simple and rapid method of satisfying himself that the calliper fitted accurately and therefore fulfilled its function. As the result of an investigation to determine whether callipers, fitted by the usual methods, are in fact weight-relieving, an "indicator" which reveals the efficiency of a calliper in a few minutes has been developed.

Present Method of Fitting a Calliper

At present the fit of a calliper is usually determined by the following tests:

1. The patient stands while the physician determines the fit of the calliper ring.

No device will replace careful fitting of the ring in the groin. It is essential that the ring should be an accurate fit around the circumference of the thigh, with the tuber ischii at the upper level of the ring. Charnley (1947) has indicated that the tuber ischii need not rest on the ring, and indeed is pushed off it at each step by its muscular attachments. Most of the weight-bearing is taken on the fibro-fatty fold of the buttock. Charnley also states, "H. O. Thomas never referred to the tuber ischii either by name or implication in his description of 1890. He constantly referred to the fitting of the ring in the groin."

2. The patient stands wearing the calliper and the surgeon asks him whether he can feel the heel of the affected limb resting on the heel of his shoe.

A reliable answer to this question may not be forthcoming for the following reasons:

(a) A patient not understanding clearly what is meant by the question may supply a misleading answer. This is particularly the case with children and deaf patients.

(b) The skin of the heel is thick and relatively insensitive. Many elderly patients and patients whose employment entails much standing have callosities which further diminish the sensitivity of their skin. It is consequently difficult to be certain of the spatial relationship of the skin of the heel to the shoe.

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PLATE XXXVIII



Testing Efficiency of Thomas Walking Calliper

(c) The long-term patient reporting at regular intervals for review soon realizes that an affirmative answer results in lengthening of his calliper, involving transient but appreciable discomfort. Thus the opinion of the patient may not be entirely reliable and an unfortunate result may follow.

3. The physician unlaces the shoe on the affected side and tries to insinuate his finger under the instep in order to determine the relationship of the patient's heel to the shoe.

It is usually accepted that if the calliper ring is a satisfactory fit and the calliper is the correct length a finger can be slipped easily between the patient's heel and the shoe. This test is frequently invalidated by the helpful patient who tilts his pelvis, thus taking his body weight on the normal side. As a result there is no difficulty in carrying out this procedure, but it is of no value in determining the fit of the calliper.

4. A portion of the counter of the shoe can be removed to provide visual evidence of the position of the heel in the shoe.

H. O. Thomas frequently employed this method, but despite its obvious advantages it is seldom used except for demonstration purposes. It is unpopular with the patient as it mutilates the shoe.

A number of patients wearing walking callipers which fitted satisfactorily according to the preceding tests have been X-rayed while standing, a contrast medium of barium sulphate and collodion being employed to define the soft-tissue shadows in the shoe. Lateral films of both the normal and the affected limbs showed that in the great majority of cases full weight-bearing was taking place. Due allowance had to be made for the presence or absence of deformation of the heel pad. Such a procedure is obviously too complicated, expensive, and time-consuming for routine use, and therefore a simple "indicator" has been devised which will reveal whether or not the calliper is the correct length, always providing the ring is a good fit in the groin (Plate XXXVIII).

The Indicator

This consists of two components: (1) a heel pad (Fig. 1), and (2) an indicator box.

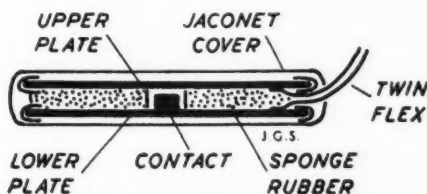


FIG. 1.—Diagram to show construction of heel pad.

New Appliances

1. *The Heel Pad.*—This is approximately 0.4 cm. thick and consists of two metal plates, one of which has a contact, separated by a thin sheet of sponge rubber. The plates have insulated edges and are held together by a washable jaconet cover. Fine twin electrical flex is attached to one corner of the pad. Pads are made in two sizes to fit shoes worn by either sex.

2. *The Indicator Box.*—This consists of a plastic container 7.5 cm. by 6.5 cm. containing a 3.5-volt battery, push-pull switch, jack-plug, and bulb-holder with bulb. The bulb illuminates a translucent panel in the front of the box. The back can be removed, giving easy access to the component parts. The flex from the heel pad is plugged into the jack-plug socket in the indicator box. The switch is pulled out and the circuit tested by pressure over the heel pad before use.

METHOD OF USE (Fig. 2)

The heel pad is slipped into the heel of the patient's shoe with the flex on the medial side so that it emerges on that side. The shoe is then fitted

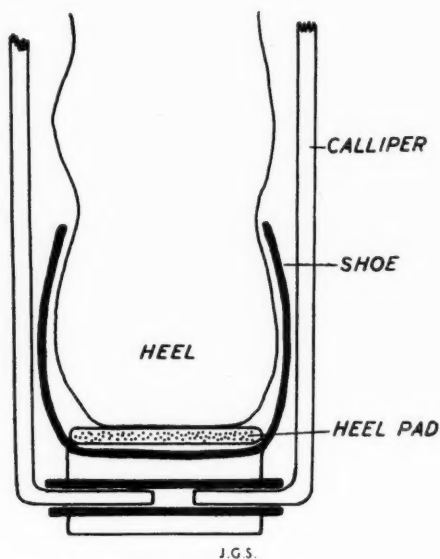
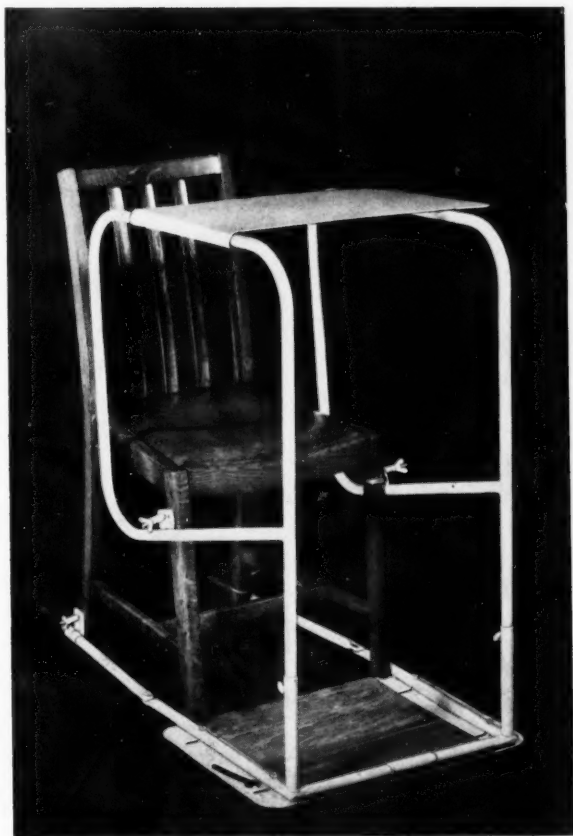


FIG. 2.—Showing insertion of pad.

and attached to the calliper and the calliper straps are adjusted. The plug is inserted in the indicator box and the patient instructed to stand squarely on his two feet. As the edges of the metal plates are insulated the circuit is completed only by pressure over the centre of the pad. Consequently, if

PLATE XXXIX



Special chair for arthritics with table in place.

PLATE XL



Patient pulling herself up out of the chair.

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Testing Efficiency of Thomas Walking Calliper

the indicator panel lights up, then the patient is weight-bearing and the calliper must be lengthened until no light appears. The length of the flex allows the patient to walk a few steps with the heel pad *in situ*. A definite answer is thus obtained immediately to the question, "Is the calliper the correct length?" This answer is not only obtainable at the first fitting, but equally readily each time the patient reports for review.

Conclusion

The apparatus described has been in use for the past four years. Recently a small electric torch casing, suitably modified, has been used instead of the indicator box. This casing clips on to the side bar of the calliper and facilitates testing while walking.

Acknowledgment

I wish to thank Professor Walter Mercer, Mr. W. Veitch Anderson, and Group Captain C. J. S. O'Malley for their help and encouragement.

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SPECIAL CHAIR FOR ARTHRITIS

PATIENTS with rheumatoid arthritis whose knees are weak or stiff have great difficulty in sitting down in or getting up from a chair unaided. This is due to the fact that the chair, whether it has arm rests or not, is easily pushed back over the floor.

To obviate this a special attachment has been designed which can be fitted to any ordinary dining-room chair. The attachment consists essentially of two tubular iron frames fixed to a base frame, and this in turn is fixed to the chair. The base frame incorporates a rubber mat mounted on sheet metal, on which the patient stands when attempting to sit down or get up, so that it is impossible for the chair to move owing to the patient's weight. The two side frames allow the patient to use her hands to assist her. A shelf that can be swivelled round out of the way acts as a convenient tray for working on or eating from. Spring clips can be fitted to the side to take crutches or sticks. The width of the floor frame is adjustable so that it can be fitted to chairs of varying widths; the height is also adjustable, as can be seen from Plate XXXIX. Plate XL shows a patient pulling herself

Book Reviews

out of a chair. It will be obvious that the chair cannot move even when the patient's knees are rigid.

This appliance, which costs about £11 to make, has proved a great boon to a number of our patients.

Acknowledgments

My thanks are due to Mr. Lofton, of Messrs. M. Masters & Sons Ltd., who assisted in the construction of the chair, and to Miss Ann Greaves for the photographs. I am indebted to Dr. Francis Bach for allowing me to test the chair in the Rheumatism Unit of St. Stephen's Hospital.

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Chelsea.

BOOK REVIEWS

Proceedings of the International Congress of Physical Medicine, London, 1952. Pp. 344; illustrated. 30s. London: Headley Bros. 1954.

The Seventh International Congress of Physical Medicine, which met in London in 1952, was the first to be held under the auspices of the International Federation of Physical Medicine and was an event of supreme importance in the development of this specialty. This was because it marked the acceptance on an international scale of physical medicine as embracing not only the application of physical agents to medical diagnosis and treatment, but also the full management of those diseases in the treatment of which such methods predominate, particularly the medical locomotor disorders. For this reason the Congress demanded the fullest record, and this has indeed been achieved in the *Proceedings*.

Following a historical note and a list of officers of the Congress and Federation are descriptions of the opening ceremony and the scientific programmes. To those who were present—and there were some 231 full members as well as 138 associate members—the listed names and addresses of those attending the Congress will be found most useful, and a perusal of these names will doubtless bring back happy memories of the many new friendships formed at that time. Similarly a description of the provincial tour, so luckily blessed by fine weather, will recall, particularly to overseas members, a week of visits to some of the loveliest parts of England.

It is, however, the 54 scientific papers read at the Congress which make up the major part of this volume. Clearly it is impossible in a short space to discuss these individually, but in brief the opening papers of the late Dr. Frank Howitt (Great Britain), Drs. F. H. Krusen (United States), S. Clemmesen (Denmark), and V. E. Klare (Austria) on the development of physical medicine in the last decade precede reviews of the modern management of the chronic rheumatic disorders with particular reference to the use of endocrines and surgery; also papers on the management of degenerative joint disease both of

Book Reviews

the peripheral joints and of the spine, as well as an abundance of papers on rehabilitation and resettlement in general and its application to geriatrics and poliomyelitis in particular. The more technical side of physical medicine is similarly well represented by contributions on various forms of physiotherapy and by several papers on electrodiagnosis with special reference to electromyography. Many of these contributions contain hitherto unpublished and valuable original work which deserves full study, but in general the papers are uneven in their standard. This is perhaps inevitable at an International Congress, and particularly at one devoted to a subject which has grown so rapidly in recent years. This unevenness is reflected in the fact that only twenty papers supply useful references. This is, however, no criticism of the quality of the papers without references, for the careful reader will note that the papers containing the largest lists are devoted to techniques no longer in general use!

The *Proceedings* also contains a list of the sixteen scientific films shown, a list of the scientific, historical, and trade exhibits, and illustrations of the Congress insignia. The description of the opening ceremony, much to the reviewer's disappointment, makes no mention of the reluctance of the ceremonial lamp to light—a situation that was saved only by the adequacy of Lord Tedder's cigarette lighter.

Any review of this volume would be incomplete without a word of praise for the excellence of the production. To assemble the proceedings of the Congress, at which some twenty-two countries were represented and at which both English and French were the official languages, into a single volume apparently free from editorial mistakes is surely no mean achievement. The papers, despite their diversity, are presented in a uniform style and the references have obviously been carefully checked. The whole is rounded off by an index of authors and a good subject index. Your reviewer was not altogether surprised to learn that the preparation of the material was in the capable hands of Mr. H. C. Papadopoulos, whose work as Sub-editor of these *Annals* is well known to the members of the Association. The printers also deserve a meed of praise for their part in this handsome production. As a result of these combined labours, in conjunction with those of the Editorial Board, an outstanding volume has been produced which will doubtless have pride of place on the bookshelves of most specialists of physical medicine.

A. T. RICHARDSON

The Rehabilitation and Resettlement of Disabled Persons. 1s. 6d. London: British Medical Association. 1954.

This is a memorandum of evidence submitted to the Interdepartmental Committee on the Rehabilitation and Resettlement of Disabled Persons by the Council of the British Medical Association. It reviews the development of the rehabilitation and resettlement services in Great Britain and gives a critical appreciation of the present position.

The Council concluded that about 25% of patients passing through acute general hospitals could be helped by planned rehabilitation. It emphasizes strongly that the initial stimulus must come from the medical profession, and

Book Reviews

urges more doctors to accept responsibility for rehabilitation and resettlement. The structure and function of the resettlement clinic are fully described and the widespread adoption of such clinics is recommended. The Council stresses that more provision should be made for planned convalescence in residential and day centres. It recommends better selection and medical supervision of patients for industrial rehabilitation units, greater care in the selection of disabled persons for sheltered employment, more practical interest on the part of industrialists, and better planning of work for the homebound.

Criticism is levelled at the complex and confusing machinery that typifies the present resettlement services and a strong plea made for a more integrated and simple administration. Among new ideas the Council suggests are: a certificate of partial fitness for admission of a patient to an industrial rehabilitation unit, more research into job analysis, and monetary rewards for work therapy in convalescence.

The factual, realistic, and constructive approach of this memorandum should result in a wider understanding of the problems and achievements of the resettlement and rehabilitation service. All physical medicine specialists should have a copy of this publication and use it as a basis for propaganda and future research.

C. B. WYNN PARRY

Comment Traiter la Sciatique. By J. A. LIÈVRE. Pp. 120. 600 francs. Paris: Editions Médicales Flammarion.

This short book on sciatica by Dr. Lièvre, who is physician to the Hôpital Tenon, Paris, and a distinguished rheumatologist, is based on his clinical experience and close observation of 3,000 patients. In it he discusses symptomatology, causation, and surgical and medical treatment, devoting a chapter to a description and critical review of physical measures such as vertebral traction, manipulation, and ultrasonic therapy. In his opinion only one in fifteen or twenty cases needs operation, and there are no longer "incurable cases" of sciatica. He favours rest, analgesics and anti-inflammatory drugs, epidural injections, and traction; radiotherapy, he considers, has still to find its place in treatment, but spa treatment has a part to play in convalescence and in the prevention of a recurrence.

He reviews his subject wisely. Among his 114 references, discriminately chosen, are many important British and American papers—an unusual finding in French literature.

This is excellent postprandial reading for the busy physical medicine specialist.

FRANCIS BACH

ABSTRACTS OF THE LITERATURE

An Experimental Study of the Functions of the Lumbrical Muscles of the Human Hand. K. BLACKHOUSE and W. CATTON. *J. Anat.*, 1954, **88**, 133.

To demonstrate the functions of the lumbrical muscles a needle electrode was inserted into the second lumbrical muscle and electromyographic tracings were taken during the various hand movements. Subsequently a study was made of the movements following electrical stimulation of the muscle with a stimulator giving a condenser shock discharge of 0.5 millisecond at a frequency of 50 to 100 per second and an amplitude up to 60 volts A.C.

It was concluded that the principal action of the lumbrical muscle is extension of the interphalangeal joint and weak flexion of the metacarpophalangeal joint; the muscle has no effect on rotation or radial deviation.

A. C. ELKIN

Biophysics of Junctional Transmission. P. FATT. *Physiol. Rev.*, 1954, **34**, 674.

This is a detailed review of current opinion on the two main theories of junctional transmission—namely, electrical and chemical—and comes from the John Curtin School of Medical Research, Australia.

The fundamental issue is whether intercellular transmission is accomplished by spread of an electric current from pre- to post-junctional structures (as in conduction of an impulse in nerve fibre) or whether a special chemical process at the junction is responsible. According to the hypothesis of electrical transmission, the electrical impulse at the terminals of the prejunctional cell penetrates the post-junctional cell in the correct direction and suitably alters its excitability. The same general mechanism is thus concerned in the spread of excitation both within and between cells. The chemical transmission hypothesis is that the impulse in the prejunctional cell causes a special chemical transmitter to be liberated at its terminals. This substance reacts with another substance, the receptor, on the surface of the post-junctional cell, altering the physicochemical properties of its surface membrane, and hence the excitatory state of the cell.

After examining both hypotheses at great length, the author concludes that the changes occurring at the post-junctional membrane can be explained only by the chemical, and not by the electrical, hypothesis.

R. HARRIS

The Vascular Response of the Skin to Ultra-violet Light. M. W. PARTINGTON. *Clin. Sci.*, 1954, **13**, 425.

Since the original observation of Finsen in 1899 that irradiation of the skin causes a long-lasting vasodilatation there has been some doubt as to the truth of Lewis's suggestion that this was due to the release of an H-substance (such as histamine) from the damaged epidermal cells. The present author reports his experiments, carried out at the London Hospital, designed to answer this question. He used human subjects with normal skins subjected to mercury-vapour sources of ultraviolet light applied to anatomically comparable sites and also carried out some studies on rabbits. He found that when histamine was pricked into both normal skin and irradiated skin no difference could be

Abstracts of the Literature

detected, suggesting that there is no increase in the amount of free histamine present in skin reddened by ultraviolet light. In addition, pre-treatment of the skin with histamine liberators such as pethidine, or injecting pethidine immediately after irradiation, produced no alteration, suggesting that depletion of the skin histamine does not affect the response to ultraviolet light. He also showed that pre-treatment with 100 mg. mepyramine produced no alteration in the minimum erythema dose of ultraviolet light, while it did have a significant effect in reducing the response to histamine.

Rabbits respond differently to histamine in that an obvious triple response cannot be obtained. Nevertheless irradiation with ultraviolet light does produce a red reaction after a latent period. Administration of mepyramine did not prevent the development of the red reaction to ultraviolet light in this animal, but did prevent the accumulation of intravenously injected trypan blue at the site of injection of histamine.

The author concludes from his experiments that the vascular response of the skin to ultraviolet light is not due to the release of histamine and that it cannot be explained on the basis of the triple response. He agrees with Pickering that this is of the "delayed", "tuberculin-like or contact eczematous" type. He comments on the rabbit experiments, which do give evidence of increased capillary permeability following irradiation with ultraviolet light, and suggests that it might be caused by the release of "intrinsic" histamine possibly due, not to the ultraviolet light, but to the emission of longer and more penetrating wave-lengths by the type of lamp used.

R. M. MASON

Heberden Oration, 1953. Spondylosis: the Known and the Unknown. SIR RUSSELL BRAIN. *Ann. rheum. Dis.*, 1954, 13, 2.

The author summarizes the knowledge on the pathology and clinical manifestations of disk lesions and their repercussions. He divides disk lesions into two types: nuclear herniation and annular protrusions. As regards the first, the nucleus pulposus in the cervical region has been calculated to be equal in volume to a red currant, but the protrusion contains fragments of the annulus and grows in size by a process of metaplasia and the addition of new tissue. The nuclear material is replaced by fibrous and cartilaginous elements and may show evidence of an inflammatory reaction. Calcification or ossification may supervene. In annular protrusion the disk becomes dehydrated and collapses and the annulus bulges.

The disk lesion leads to reactive changes in the adjacent vertebrae and the production of osteophytes. There may be subluxation of the corresponding intervertebral joints and secondary osteophyte formation on the articular processes, leading to further narrowing of the foramina.

Variations in the normal arrangement of the roots in the foramina, displacement due to shortening of the spine, and angulation of the roots also play their part in determining root compression. Myelopathy due to pressure on the cord itself is not uncommon, and spondylosis is considered to be the commonest cause of this condition during and after middle life. The symptoms from this may simulate many neurological conditions.

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The author considers that cervical spondylosis is the commonest cause of "brachial neuritis". Together with the costo-clavicular syndrome and compression of the medial nerve in the carpal tunnel it may cause acroparaesthesia. It may give rise to pain in the muscles and joints of a particular myotome or sclerotome. Occasionally muscular wasting may be very prominent. "Frozen shoulder" is not uncommon and acute multiradicular syndrome may result.

G. D. KERSLEY

A Radicular Syndrome from Developmental Narrowing of the Lumbar Vertebral Canal. H. VERBIEST. *J. Bone Jt Surg.*, 1954, 36B, 230.

In this paper are reported seven cases seen at the University Hospital, Utrecht, in which signs and symptoms of cauda equina disturbance appeared when the patient stood or walked, but disappeared immediately he became recumbent, findings on neurological examination at rest being normal. All the patients were men aged between 35 and 56 at the time of onset of the condition. The most typical symptoms were tiredness and loss of power in the legs, anaesthesia and numbness in the sacral dermatomes, and bilateral sciatica.

Of the ancillary aids to diagnosis, myelography produced the only constant results, showing an absolute block in all seven patients. Radiography of the lumbar spine produced no helpful results, and when the cerebrospinal fluid was examined the Queckenstedt test gave normal results in four cases and abnormal in three, and the protein content of the fluid was raised in only three cases out of the seven. At operation, to which all the patients were subjected, it was found that the narrowing was due to encroachment on the spinal canal by the articular processes.

Six of the patients have been followed up for periods of 2½ to 5 years and remain free from symptoms. In the seventh case the post-operative period is too short to allow assessment of the result.

D. J. E. CHESHIRE

Pain Associated with Acute Poliomyelitis. P. BENDZ. *Amer. J. Dis. Child.*, 1954, 88, 141.

Since the autumn of 1947 the author has made a clinical analysis of about 200 cases of poliomyelitis with paralysis of extremities, and he now presents his conclusions.

He finds that the character and distribution of the pain coincide with the symptoms in common root affections such as herniated intervertebral disk and acute polyradiculitis, and that the pain has both neuralgic and myalgic elements, generally with a radicular genesis, the neuralgic element being referable to the dorsal roots and the myalgic to the ventral roots.

Local and general methods of treatment to alleviate the pain are described. The author advocates caffeine in particular as being adequate to relieve neuralgic pain, and various local measures such as local hyperaemia or analgesia as well as vibration massage to alleviate myalgic pain. For the treatment of acute painful muscle contractures (muscle spasm) he recommends a simple method consisting in the production of reactive hyperaemia after brief arterial stasis by means of a blood-pressure cuff, which brings about immediate freedom from pain to allow muscle extension.

BASIL KIERNANDER

Abstracts of the Literature

The Muscular Control of the Arches of the Foot in Standing. An Electromyographic Assessment. S. SMITH. *J. Anat.*, 1954, **88**, 152.

In this paper are presented the results of a study of the action of muscles of the leg and foot which might maintain the arch of the foot during standing. After studying the mechanics of the foot in standing, the author concluded that there is a static and a dynamic phase which alternate every thirty seconds. He therefore made electromyographic recordings with surface electrodes of most of the muscles associated with standing. As a result he claims that during the static phase of standing the arch is maintained by the passive strength of the tissues of the part—that is, bones, ligaments, etc.—but that during the dynamic phase the function is taken over by the muscles, his main conclusion being that the two mechanisms act alternately and not synchronously.

A. C. ELKIN

The Foot as a Half Dome. J. MCKENZIE. *J. Anat.*, 1954, **88**, 558.

Reasons are given (following previous writers) why the foot should be regarded as a half-dome rather than as a system of one transverse and two longitudinal arches: (1) the trabeculae within the tarsal bones radiate from the talus downwards and outwards to the periphery of the foot; (2) the functional activity in walking is not confined to the longitudinal and transverse arches. It is considered that such a conception gives a better understanding of the deformities seen in flat-foot.

D. TELL

Direct Observation of Changes in Tension in the Supraspinous and Interspinous Ligaments during Flexion and Extension of the Vertebral Column in Man. P. H. S. SILVER. *J. Anat.*, 1954, **88**, 550.

A method was devised whereby tension in the ligaments could be recorded simultaneously with electromyography of the erector spinae muscles during flexion and extension of the lumbar spine. It was found that as flexion took place the tension in the ligaments increased with the separation of the lumbar spines. The erector spinae in full flexion were completely relaxed; the development of tension in the ligaments preceded this relaxation. This overlap between ligamentous tension and cessation of erector spinae activity is accounted for by the presence of elastic fibres in the ligaments.

D. TELL

Symptoms of Anxiety and Tension and the Accompanying Physiological Changes in the Muscular System. P. SAINSBURY and J. J. GIBSON. *J. Neurol. Neurosurg. Psychiat.*, 1954, **17**, 216.

In an attempt to demonstrate the presence of increased muscular tension in patients with symptoms arising from the muscular system the authors studied thirty anxious and tense subjects. These were divided into two groups according to whether or not head, neck, arm, and back symptoms were present. An inventory was made of their feelings (e.g. anxiety) and also of bodily complaints ascribable to muscular activity (e.g. backache). Muscular tension was measured electromyographically with the patient relaxed.

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The authors found that the group with muscular symptoms showed significantly greater tension in the relevant muscle. They conclude that the bodily mechanism as a whole receives increased innervation in anxious patients.

[This article adds to the increasing amount of objective evidence in the study of psychosomatic rheumatism and fibrositis.] A. C. ELKIN

Assessment of Function after Arthroplasty of the Hip. MARGARET M. SHEPHERD. *J. Bone Jt Surg.*, 1954, **36B**, 354.

In this preliminary communication, based on the work of the British Orthopaedic Association Research Group on Arthroplasty of the Hip, is described a method of assessment of post-operative results which takes into account pain, range of movement, and an objective estimate of function together with the patient's own evaluation. Range of movement and functional activity are compounded in terms of indices, and the criteria taken together give a comprehensive and objective assessment.

[This paper points the way to a higher standard of scientific accuracy in the assessment of clinical results, and, as such, should be read in the original by all those who are engaged in clinical research.] D. J. E. CHESHIRE

Osteitis Condensans Ilii and its Differentiation from Ankylosing Spondylitis. M. THOMPSON. *Ann. rheum. Dis.*, 1954, **13**, 147.

The diagnosis of osteitis condensans ilii was confirmed in 13 out of 20 cases in which it had been suggested, and in 7 a forme fruste of ankylosing spondylitis was suspected. Of the true cases 90% occurred in women.

The lesions in this disease may be unilateral or bilateral, and there may be involvement of the sacrum. The joint spaces are usually normal. Occasionally some slight narrowing and lipping at the lower margin or some minimal irregularity may be seen. Patients have long remissions, and, although the onset may be related to a pregnancy, a subsequent pregnancy does not necessarily aggravate the symptoms. The erythrocyte sedimentation rate is within normal limits, no associated systemic disturbance is present, and there are no consistent collateral findings on physical or radiological examination.

G. D. KERSLEY

Histological Studies of Pelvo-spondylitis Ossificans (Ankylosing Spondylitis) correlated with Clinical and Radiological Findings. B. ENGELFELDT, R. ROMANUS, and S. YDEN. *Ann. rheum. Dis.*, 1954, **13**, 219.

The authors state their views of ankylosing spondylitis, on the basis of the histological examination of 130 cases of this disease, as follows. In all cases there appears to be an initial stage of inflammatory decalcification, bone absorption, and destruction with reactive sclerosis in adjacent tissues. Later there is a secondary reparative phase with proliferation, ossification, and reconstruction. The two changes may be present concurrently in different parts of the skeleton. In the spine, in the ventral portions of the vertebrae, there is destruction and the anterior concave contour may become straight or even convex. Inflammatory cell infiltration occurs near the bone under the adjacent soft tissues and adjacent to the ligaments in the muscular and fatty tissues. Later there is decrease in

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vascularity with hyalinization of the connective tissue and newly formed bone production.

The authors consider the condition to be caused, as a rule, by prostatic or vesicular infection with a spread by the vertebral venous route.

G. D. KERSLEY

Observations on the Treatment of Rheumatoid Arthritis by Transfusions of Blood from Pregnant Women. C. JOSEPHS. *Brit. med. J.*, 1954, 2, 134.

The effects of intravenous infusion of blood from pregnant and non-pregnant donors in 98 cases of rheumatoid arthritis were compared by means of subjective, objective, and laboratory tests. No significant difference was found in the results obtained in the two groups. Occasionally dramatic improvement occurred after infusion of blood from both pregnant and non-pregnant women. Marked subjective and objective improvement was noted in 19% of cases receiving blood from pregnant donors and in 13% of cases given blood from non-pregnant donors.

ANDREW ZINOVIEFF

Phenylbutazone and Renal Function. B. MCD. JOHNSON and I. M. LARKIN. *Brit. med. J.*, 1954, 2, 1088.

A case of rheumatoid arthritis is reported in which the patient died of anaemia following the administration of 2,600 mg. of phenylbutazone. The autopsy revealed fibrotic contracted kidneys, and it is suggested that poor renal function may prove to be an important contraindication to the use of this drug.

ANDREW ZINOVIEFF

Multiple Visceral Lesions due to Phenylbutazone Toxicity. J. R. NASSIM and T. PILKINGTON. *Brit. med. J.*, 1954, 2, 1028.

The authors report a case of osteoarthritis of the hip in which the patient appeared to be very sensitive to phenylbutazone (600 mg. daily) and was severely ill with multiple visceral lesions, the picture resembling that of leptospirosis or viral hepatitis.

ANDREW ZINOVIEFF

Sodium Salicylate and Probenecid in the Treatment of Chronic Gout. F. G. W. MARSON. *Ann. rheum. Dis.*, 1954, 13, 233.

The author compares the effect of salicylates, usually in a dose of 90 gr. a day, with that of probenecid ("benemid"), 2 g. daily, on the excretion of uric acid and in reducing the plasma uric acid in gout. He considers that, although both medicaments are valuable, salicylates produce the best effect with fewer toxic symptoms in the majority of cases. He finds that the coincident administration of probenecid and salicylates does not nullify the uricosuric effect.

G. D. KERSLEY

Nuclear Herniations of the Intervertebral Disc. Their Radiological Manifestations and Significance. A. C. BEGG. *J. Bone Jt Surg.*, 1954, 36B, 180.

This paper from the Dunedin Hospital and Otago Medical School analyses the significance of radiological appearances resulting from herniations of the degenerating intervertebral disk.

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According to the author, herniations into the spongiosa of the vertebral body (Schmorl's nodes) are detectable radiologically only when a thin layer of cortical bone is deposited around them. Herniations through the anterior part of the annulus lead to erosion of the anterior-superior margin of the vertebral body or anterior osteophytes, when the degenerating disk material spreads radially pushing the annulus fibrosus before it. In the lumbar region, herniations may occur beneath the epiphysal plate, and are frequently radiologically misinterpreted as persistent epiphyses.

He distinguishes four types of herniation of the nucleus pulposus through the posterior segment of the annulus fibrosus: projections, intermittent prolapses, extrusion through a tear in the annulus, and scarred disks.

The paper is liberally illustrated with radiographs, and the clinical features of each type of herniation are indicated.

[All who deal with problems of backache are advised to read this paper.]

P. J. R. NICHOLS

Vertebral Collapse after Cortisone Therapy. J. LUDER. *Gt Ormond St J.*, 1954, 7, 15.

The occurrence within three years at the Hospital for Sick Children, Great Ormond Street, of four cases of vertebral collapse after cortisone therapy is reported to direct attention to this perhaps serious complication of prolonged cortisone therapy. Two of the patients were suffering from rheumatoid arthritis, one from Still's disease, and one from chloroma. Each case is presented in detail, the treatment before and after vertebral collapse being described.

The aetiology and pathogenesis of the vertebral lesions are fully discussed with reference to the occurrence of osteoporosis in rheumatoid arthritis and Cushing's disease. It is stated that the end-results are not yet known, but may be analogous to those in Cushing's disease.

It is concluded that the vertebral lesions described affect the lower thoracic and lumbar regions of the spine, the affected vertebrae being grossly osteoporotic, flattened and generally biconcave, but not displaced or crushed. The intervertebral disks are enlarged and biconvex and may play an active part in inducing compression of vertebral bodies, perhaps by fluid retention. No angulation of the spine or interference with spinal-cord function has been observed so far, but may occur later. While pain probably occurs in the majority of these cases, it may be mild or absent, and it is therefore stressed that in all cases receiving prolonged courses of cortisone the spine should be examined radiologically at frequent intervals. Anything over 5 g. of cortisone, a total ordinarily reached in two to three months' treatment, should be regarded with caution, although the danger level is more usually two or three times this dose.

The author does not consider this complication a contraindication to prolonged cortisone therapy in cases where this is indicated, in view of its relative benignity, but feels it may well induce caution in the use of the drug over long periods in less well established conditions. He suggests that the cause may lie in a disturbance of the bone matrix with resulting nitrogen loss, and that a trial might be given to the steroid hormones in an attempt to prevent the complication. He also suggests that patients should be kept ambulant as much as possible to minimize the well-known osteoporotic effect of disuse.

BASIL KIERNANDER

Abstracts of the Literature

Oral Cortisone Therapy in Periarthritis of the Shoulder. N. J. BLOCKEY, J. K. WRIGHT, and J. H. KELLGREN. *Brit. med. J.*, 1954, 1, 1455.

The effects of a four-week course of oral cortisone therapy are compared with those of administration of an inert control medicine in thirty-two cases of periarthritis of the shoulder. Cortisone therapy appeared to hasten the relief of pain and the restoration of movement and fewer patients required manipulation. On the other hand, individual response to treatment was so variable that no statistical significance between the two methods was demonstrated in this trial.

A. ZINOVIEFF

The Place of Manipulation in the Relief of Low Back Pain. J. G. CRAIG. *N.Z. med. J.*, 1954, 296, 429.

In this paper, read at the Annual Conference of the New Zealand Branch of the Empire Rheumatism Council, the author stresses the value of manipulation in suitably selected cases of low back pain. He gives details elicited at examination in eleven separate back conditions in which he considers that manipulation can be of value, the aim being to "restore movement to a joint where such natural function has been lost". Details are given of methods recommended to prevent the occurrence and recurrence of low back strain. The author concludes that "in many cases complete reliance on manipulative therapy is quite unjustifiable, but it should also be remembered that in some cases manipulation is the only method by which joint function can be restored or improved".

A. ROWATT BROWN

Conservative Management of Congenital Clubfoot Deformity. F. KUHLMANN. *Amer. J. Dis. Child.*, 1954, 87, 440.

The author describes a practical method of treatment by means of the Denis Browne splint for the uncomplicated case of talipes equinovarus, to stress the effectiveness of which he reviews 17 cases from the Crippled Children's Division of the Vermont State Department in which it was used successfully. The technique of strapping the splints is described with illustrations. The various stages of treatment are given and the steps taken to prevent recurrence, and to treat this when it takes place, are explained.

The author considers that this manipulative method of correction should be used more widely in the conservative management of the club-foot deformity.

BASIL KIERNANDER

Anatomical Considerations in Injection of the Hip Joint. J. M. F. LANDSMEER and A. K. J. KOUMANS. *Ann. rheum. Dis.*, 1954, 13, 246.

In this paper the authors discuss the technique of intra-articular injection of the hip-joint. According to them the needle should be inserted at a point up to 5 cm. caudal of the base of the greater trochanter and directed to a point on the middle third of a line between the iliac spine and the pubic tubercle. The needle should run right over the ventral surface of the femoral neck. As soon as the needle touches a bony resistance—the caudal aspect of the femoral head—its aperture is within the joint space.

G. D. KERSLEY